

# What Research Says About Environmental Education

Jan Weaver PhD  
University of Missouri - Environmental Studies  
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[www.meea.org](http://www.meea.org)

What do people think  
about the environment  
and about  
environmental education?

**They think environmental education is important,**

**95% of Americans and 96% of parents think  
environmental education should be taught in  
schools,**

Coyle, K. 2005. Environmental Literacy in America: What ten years of NEETF/Roper Research and Related Studies Say About Environmental Literacy in the U.S. <http://www.neefusa.org/pdf/ELR2005.pdf>

**They think they know a lot but they don't...**

**70% of Americans rate themselves as fairly knowledgeable about environmental issues, but only ~10% receive a passing grade on a multiple choice quiz of basic knowledge.**

**The biggest factors are a causal disconnect, where we get our environmental information, and the tendency to hear what we already believe...**

- People don't understand multi-step causal relationships,**
- they get information about the environment in sound bites from biased sources and**
- they tend to hear or select the information that reinforces what they already believe.**

What can high quality  
environmental  
education  
do for K-12 schools?

# What are Schools and Teachers interested in?

- **Improved test scores on standardized tests**
- **More engaged and enthusiastic learners**
- **More engaged and enthusiastic teachers**

The State Environmental Education Roundtable\* and the Pew Charitable Trust funded three studies of Environment as an Integrating Context (EIC) on student scores on standardized tests:

- 1998 Closing the Achievement Gap:  
Using the **E**nvironment as an **I**ntegrating **C**ontext
- 2000 California Assessment Project
- 2005 California Assessment Project Phase 2 -  
Elementary Schools

[www.seer.org](http://www.seer.org)

\*SEER - California, Colorado, Florida, Iowa, Kentucky, Maryland, Minnesota, New Jersey, Ohio, Oregon, Pennsylvania, Texas, Washington



## **1998 Closing the Achievement Gap - 40 schools, 250 educators**

**Teachers and administrators reported that the principal effects of adopting EIC approaches include (percent of survey respondents):**

- **increased enthusiasm and commitment toward teaching (95%).**

Many teachers commented that adopting EIC approaches had revitalized their interest in education and their profession.

- **better working relationships with students and colleagues (94%).**

The increased enthusiasm of both teachers and students helped them become a learning-teaching team focused on the same objectives.

- **more opportunities to explore new subject matter than traditional, discipline-based teaching (95%).**

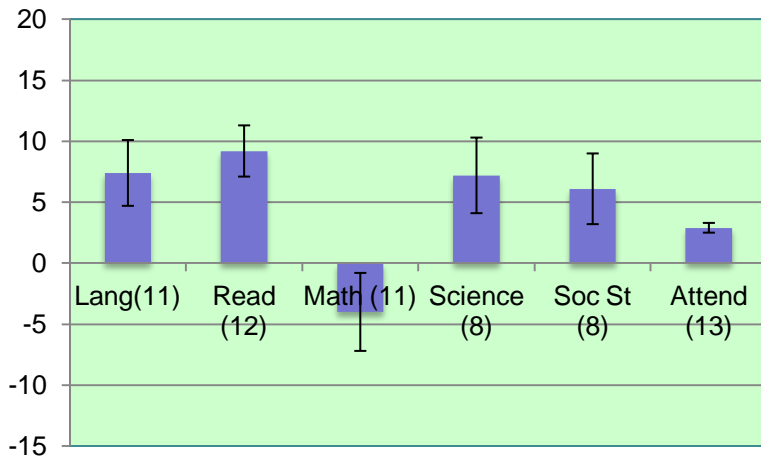
Teachers found that the interdisciplinary nature of EIC programs challenged them to continue their professional development and personal growth, to learn new content and skills, and to explore how to interconnect subject areas.

- **frequent occasions to use innovative instructional strategies (96%).**

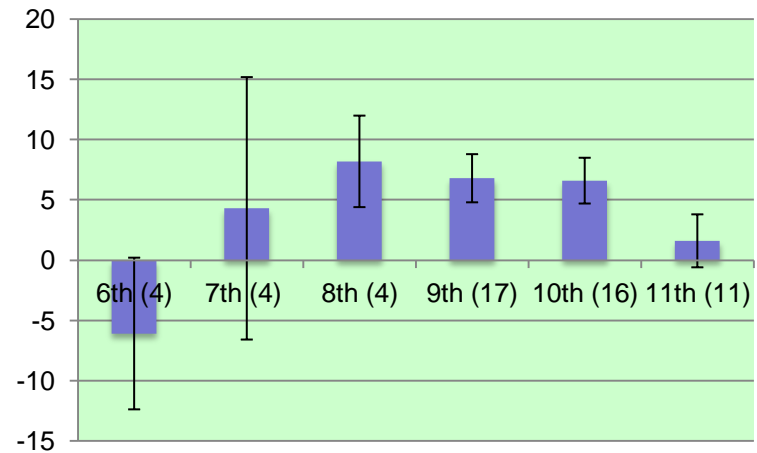
Teachers discovered that EIC, because of its problem-solving, project-based methods, was particularly amenable to alternative instructional strategies, authentic assessment, team teaching and cross-disciplinary instruction.

# Paired High School Classrooms 2000

Average % difference in scores on standardized tests in EIC Classrooms compared to Traditional Classrooms



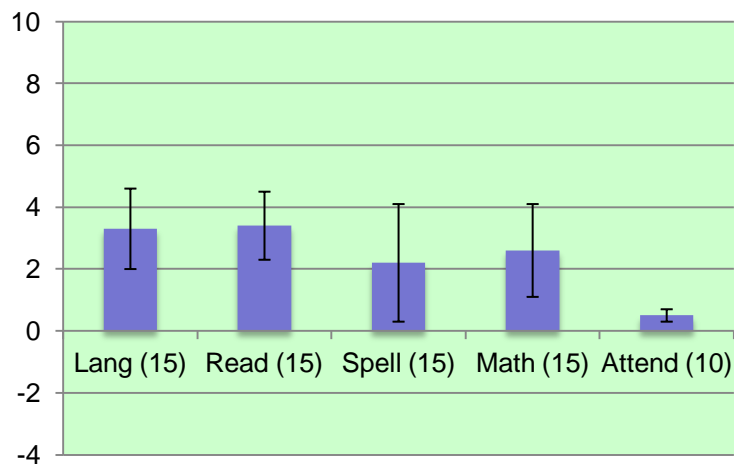
by subject



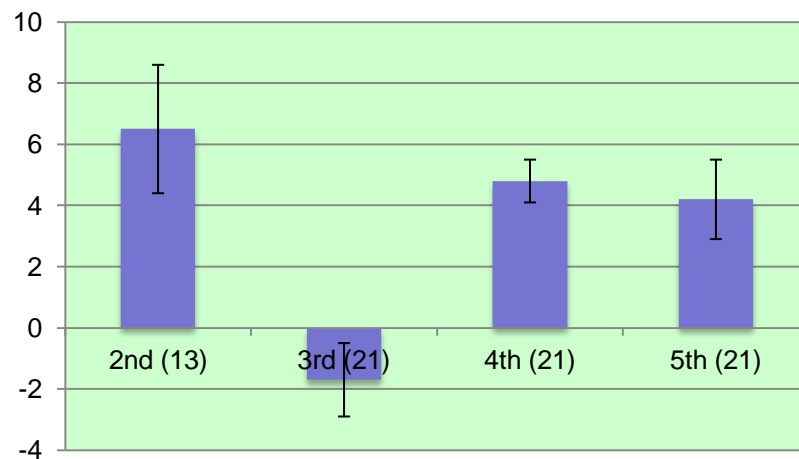
by grade

# Paired Elementary Classrooms 2000

Average % difference in scores on standardized tests in EIC Classrooms compared to Traditional Classrooms



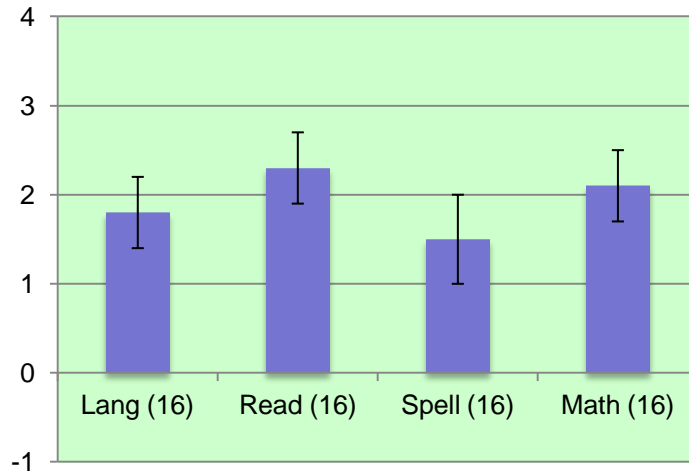
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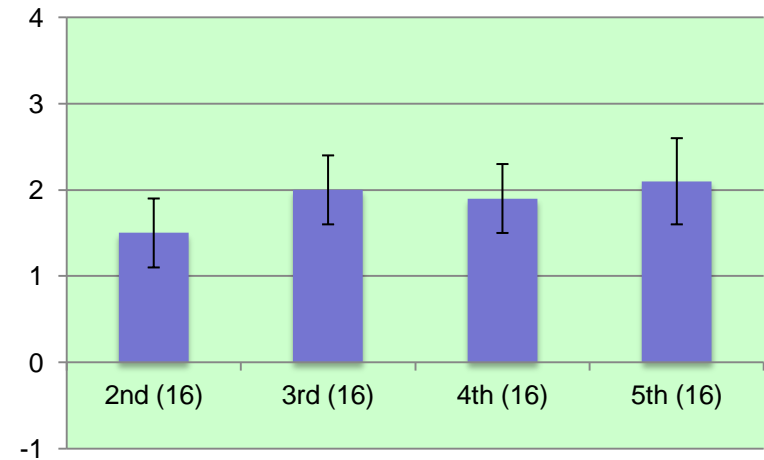
by grade

# Paired Elementary Classrooms 2005

Net average years/five scores on standardized tests in EIC Classrooms exceeded Traditional Classrooms' scores



by subject



by grade

## South Carolina EIC Program in 10 Middle Schools

School	% Population that was EIC	Absenteeism	Referrals	Suspensions
A	-	Down 22%	-	Down 36%
B	-	-	½ of non EIC	-
C	-	Down 16%	Down 56%	Down 75%
D	31%	22%	3%	-
E	35%	-	25%	~16%
F	37%	-	-	14%
G	19%	12%	4%	4%

All ten schools showed some degree of improved attendance, behavior and academic achievement.

## South Carolina EIC Program

“Last year I had about 72 behavioral referrals to the office because I just didn’t like my classes or my teachers, and I was bored stupid. This year I had just one referral to the office, and it really wasn’t my fault. I don’t want to get into trouble now; EIC is a neat way to learn and lots of fun. We are helping our community. I don’t want to let the teachers down. They are really neat. My grades are holding steady too, and for me, that is a good thing.” - 7th grade female student.

“I want to attend classes this year because all my teachers are so much more fun this year and seem to care about my opinion. We are doing cool things. They have taught me respect for lots of things. Learning can be fun, especially being outdoors and helping our community. Even my teachers seem to have fun this year.” -7th grade male student

What does high quality  
environmental  
education  
look like?

# What Works?

## ***1. Collaborative, Integrated, Interdisciplinary Instruction***

The curriculum involves at least 2, but as many as 4 subjects or disciplines, and includes community experts (parents, business people, agency people, scientists, ngo people); it may carry through grades, becoming more complex as students become older.

### **Examples (water quality)**

- Science - water quality tests and stream invertebrate surveys
- Math - graphing and statistics
- Thinking skills - designing experiments and investigations, interpreting evidence
- History/Government/Economics - researching regulations, history of action or inaction, economic tradeoffs in short and long term
- Language Arts - presenting work in a public setting or to the public



# What Works?

## 2. Relevant Context

- focusing on specific, **local, community based** environmental issues
- concrete, positive, action-oriented experiences

## Examples

- Community inventories** - stream invertebrate surveys, water quality tests, litter surveys, mapping big trees, nature or play areas or abandoned lots, bird feeder surveys, bee and butterfly surveys, photo diaries of the neighborhood
- Community action/service projects\*** - litter pick up, planting native flowers, growing vegetables
- Individual inventories** - trash survey, home energy use, miles traveled by car,
- Individual action projects \*** - recycling at home, reducing personal energy use (1 hour a day on non-electric entertainment), learning to ride a bike

***\*The action project should follow from the knowledge gained by the inventory!***

# What Works?

## ***3. Authentic Assessment***

Learners are judged by their outputs - research, diagrams, essays, reports, legislative bills (yes, bills), grants (yes grants), community involvement, etc.

## **Examples (water quality)**

- drafting a new ordinance, writing and implementing a watershed education grant, setting up best management practices for sensitive areas (could be school yard)

# What Works?

## 4. *Demanding Questions*

- complex cause and effect relationships
- interdisciplinary problems and issues
- **primary literature/non-fiction sources** and real life case studies

## Examples

- **Middle School - Food** -human food webs, local and global, and their dependence on ecosystem services - water cycle, pollinators, natural predators; **Energy** - local energy sources, renewable and non renewable and where they come from, how long they will last at current rates of use, how society is affected by disruption of energy sources; **Health** - immediate and upstream causes of diseases and how human impacts on the environment or dependence on energy affect them.
- **High School - inquiry and science, technology and human activity** strands using issues with local connections: pesticides, ozone hole, global warming, environmental justice, ground and surface water pollution, air pollution, bioaccumulation, invasive species, embedded energy, urban sprawl, antibiotic and pesticide resistance, peak oil, alternative fuels

# What Works?

## ***5. Interactive Approaches***

- classroom - small group discussion and cooperation, dilemma discussions, role playing, peer teaching
- community - field trips, community role models and mentors, participation in community clubs

## **Examples (for water quality)**

- Classroom** -pairs or small groups decide which local stream, water body or watershed to investigate, generate questions to ask, research in books, scientific articles on web, government web sites, come back together and post all the information on the board, seek patterns, generate new questions
- Community** - small groups determine which experts, agencies or organizations to interview to find answers to questions

# What Works?

## **6. *Learner Orientation***

- long term involvement (citizen science)
- autonomous student behavior & student choice
- learning and practicing environmental action skills
- opportunities for reflection
- hands on**

## **Examples (water quality)**

- annual census of water body - stream invertebrates, chemical tests, stream geomorphology
- mapping of watershed to determine sources of water contamination, examination of historical records, commission minutes, etc. to determine long term trends in land use that have impacted the stream
- reviewing ordinances and laws pertaining to water quality, interviewing the governmental agencies responsible for maintaining water quality, interviewing land owners for their perspective and the economic impacts of regulation
- drafting rules, policies and laws, communicating with representatives, building popular support for a particular action

How can teachers integrate  
high quality EE into their  
teaching?

# Changing Teaching (from EIC educators)

- **Start Small** - 1 team of like minded teachers (they like innovative strategies, they care about authentic student learning and have at least some concern for the environment), 2 subjects, 1 or 2 month activity
- **Plan Well** - start early, decide who is in charge of communication and other tasks, be thorough about curricular integration (don't use stuff off the shelf without modifying it to fit your school's goals)
- **Involve Administration** - bring them in at beginning, don't overpromise results, find something to give up to show your commitment, develop buy-in over time
- **Build Networks** - find and involve outside supporters who can help the students and down the road, support your requests for more resources and if need be, defend your efforts if they are challenged by people concerned about bias (think strategically)
- **Evaluate and Revise** - be clear about your own goals and objectives, have a plan for evaluating progress, use information to revise what you are doing
- **Be Patient** - build your plan gradually, add team members and study units over time, always keeping in mind the need for like minded teachers and thorough integration of curriculum standards

## Summing it up

People think EE is important, even if they aren't very knowledgeable themselves about environmental issues.

High quality EE (like EIC) isn't a magic bullet, but on average it can significantly improve scores on standardized tests across most subjects and grades, it can reduce absenteeism, referrals and suspensions, and it increases engagement and enthusiasm in students and teachers

High quality EE is Collaborative, Relevant, Authentic, Demanding, Interactive, and Learner Oriented - CRADIL

Advice for changing the classroom: Start Small, Plan, Involve Administration, Network, Evaluate, Be Patient - SPANEP



North American Association for Environmental Education

[www.naaee.org](http://www.naaee.org)

State Environmental Education Roundtable

[www.seer.org](http://www.seer.org)

Missouri Environmental Education Association

[www.meea.org](http://www.meea.org)